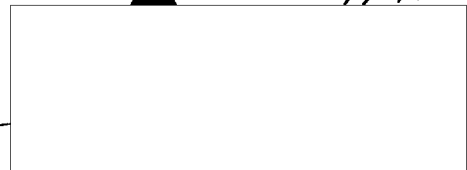


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20 November 1957

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MEMORANDUM FOR: THE RECORD

SUBJECT : Project Visit to [redacted]

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1. Time and Place of Meeting: The meeting was held on 14 November at [redacted]

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2. Attendance: [redacted]

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3. Purpose of Visit: To discuss the Wall Measurement Program at [redacted] (AD Hoc 25)

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4. Discussion:

a. [redacted] has not yet been able to obtain clear cut results from either the pulse echo or the resonance approach. [redacted] was questioned as to why they kept vascillating between the two approaches and they stated that the reason was that they were trying new techniques to each method to ascertain which worked the best. It was noted that [redacted] favors the resonance approach and has been personally doing work in that line, while [redacted] the project engineer, favors the pulse echo approach and has been doing work in that direction. [redacted] stated, however, that the more practical of the two appeared to be the pulse echo method.

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b. [redacted] stated that the resonance method gives sharp lines, but that the resonance points do not correlate with the known thickness of the test block. For example, on a three inch concrete test block, the calculated resonance is 31.3 KC. Using the resonance method, two resonances were obtained, one at 31.6 KC and one at 33.6KC, plus other strong spurious resonances. The spurious resonances are so prevalent that it is difficult to determine true resonance points, unless one knows where to look for them. This, of course, requires before-hand knowledge of the thickness of the test specimen. [redacted] feels that the spurious resonances are caused by finite width or thickness. [redacted] uses a range from 14 KC - 40 KC for resonance studies. [redacted] feels that the techniques, sensativity, and equipment are better and more proven in the resonance approach, but admits the correlation on concrete is so poor the obtainable results are worthless. [redacted] will try one more technique using [redacted]

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Memorandum for the record.

Subject: Project Visit to [REDACTED]

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the resonance method and that is using a high Q system which will oscillate precisely on frequency in the desired range. [REDACTED] uses a vacuum tube oscillator and hopes by the use of coils to produce the high Q required to obtain the sharp frequency lines needed to determine the resonance points. If satisfactory results are not obtained, [REDACTED] stated that their conclusion would be that the resonance method is not useable on non-homogenous materials.

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c. [REDACTED] in the pulse echo method is now using 2" D. concentric transducers, with a resonant frequency of 100 KC. However, [REDACTED] has found that barium titanate transducers do not have a clear cut resonant frequency as claimed by the manufacture, but will vary as much as 30 KC. [REDACTED] has found by using larger transducers in the 100 KC range, that they can move from a 3" to a 6" test block and still maintain the same order of accuracy in their results. [REDACTED] has found that glycerin produces the best bonding results. [REDACTED] is using mechanical and double pulse damping and feels that the mechanical damping of the larger transducers can be improved by improved holder design.

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d. [REDACTED] has found that surface waves can be reduced by good contact, the use of concentric transducers instead of square or rectangular ones, and by the use of larger transducers. When questioned as to optimum transducer size, [REDACTED] stated that any figure they could set would be an educated guess. It is known that the thickness of barium titanate determines the frequency and the width determines the linearity. [REDACTED] was questioned as to what the optimum frequency would be and stated that it should be as low as possible without the wavelength becoming the same size as the inclusions of the wall to be tested. [REDACTED] felt that 100 KC, which gives a 2" wavelength would be desirable. Thus, an optimum transducer would be of such a thickness as to give a wavelength larger than the inclusions; be concentric in shape; and have a hole in the center of a set size (Transducers of this shape tends to give a strong longitudinal wave and a weak surface or transverse wave).

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e. The program can be summarized by stating that [REDACTED] has not had good results with either approach, but that the pulse echo method appears to be the most practical of the two and the one capable of greater refinement.

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f. [REDACTED] was informed that the sponsor wanted a complete technical report of the program to date, by the end of the second week in December.

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Subject: Project Visit to [REDACTED]

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[REDACTED] was given a rough outline of things to include and answer in the report. The main topics are as follows: (a) Physical Limitations (b) Accuracy Limitations (c) Frequency in Wavelengths (d) Radiation Pattern (e) Reflection Characteristics (f) Absorption Characteristics (g) Scattering Phenomenon (h) Damping (i) Equipment (j) Test Results (k) [REDACTED] recommendations.

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